Amendments to the Drawings:

No amendments are made to the Drawings herein.

REMARKS

The Examiner has rejected Claims 1-5 and 7-20 either under 35 U.S.C. §102(b) as being anticipated by Giers (U.S. Patent No. 6,410,993) or under 35 U.S.C. 103(a) as being unpatentable over Giers in view of Tsukamoto (U.S. Patent No. 6,231,133). Claims 1-21 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting as unpatentable over copending Application No. 10/674,199 to Nisson.

The present invention is directed to a control scheme for a braking system which is particularly adapted to provide system redundancy, while at the same time reducing the likelihood of complete system failure in the case of catastrophic failure (such as caused by an exploding tire, a fire or the like) of one of the system components being controlled. This has been a problem with known prior art systems, which generally operate in one of two ways.

In the first type of known prior art system, multiple controllers are provided, each of which controls some of the brake system components, but not others. Thus, for example, a system may include two controllers, each providing control signals to half of the brake system components. Thus, in the case of failure of one controller, half of the system components would still be controlled.

In the second type of known prior art system, multiple controllers are provided, each of which provides control signals to all system components on a full time basis (i.e., true redundancy). While this may appear desirable in that should one of the controllers fail, all of the system components would be receiving control signals from the other controller, in practice, this type of system suffers from at least one significant drawback. Specifically, in the event of a catastrophic failure in one of the system components controlled by both controllers (such as caused by an exploding tire, a fire or the like), both control networks may be shorted out, thus causing both control networks to fail resulting in a complete loss of control of all system components.

The present invention remedies the deficiencies of both types of prior art systems. In the present invention, first and second control networks electrically connect one or more controllers with first and second brake components, respectively. An auxiliary control link electrically connects the first brake component and the second brake component, the auxiliary control link being adapted to transmit control signals which are indicative of demand for braking received by one of the first brake component and the second brake component to the other one of the first brake component and the second brake component when a failure occurs in one of the control networks. Such an arrangement provides redundancy in that should the first controller fail, the first brake component would

be provided control signals through the auxiliary control link from the second brake component. Moreover, the system is not prone to complete failure, in that should the first brake component suffer from a catastrophic failure, the first control network may be shorted out -- the second control network being safe since the first brake component was not directly connected to the second control network when it suffered catastrophic failure. Thus, other brake components which have been controlled by the first control network (now shorted out) may be supplied control signals by the other half of the "pair" to which they belong through auxiliary control links, thereby rendering only a single brake component (i.e., the one which suffered from a catastrophic failure anyway) without control signals.

Applicant respectfully submits that neither Giers nor Tsukamoto discloses, teaches or suggests the above-highlighted elements.

Giers discloses a circuit arrangement for use with a vehicle control system which comprises two circuits I and II independent of each other. Each circuit includes an input unit 3 or 4, a microprocessor 1 or 2, a commutator 9 or 10, and a brake actuation unit 5 or 6. First, the input information is processed by the microprocessor. Then signal from the microprocessor 1 or 2 is sent to the brake actuator unit 5 or 6 by means of the commutator 9 or 10 respectively. During standard operation, the commutators are in the inactive position and each

microprocessor sends control signals to the corresponding brake actuator. If an error message is issued by either microprocessor, the respective commutator is switched to the active position and control of both brake actuators is assumed by the intact microprocessor. For example, during the standard operation the commutator 9 is in an inactive position, represented by a solid line in Fig.1 of the patent, and microprocessor 1 controls the brake actuator 5. If microprocessor 1 fails, the control of the actuator 5 is transferred to microprocessor 2 by switching the commutator 9 from the inactive position to the active position, depicted by the dotted line.

Applicant respectfully submits that this system is completely different than what is claimed. The circuit arrangement disclosed in Giers is exactly one of the known prior art systems that was described above and upon which the present invention was intended to improve. Each commutator is connected directly to both microprocessors. Therefore, in an event of a catastrophic failure of one of the commutators, both control networks may be shorted out, thus causing both control networks to fail resulting in a complete loss of control of all system components.

On the contrary, the claimed system is not prone to complete failure because none of the components is connected directly to both control networks. In the event of a catastrophic failure of one of the brake units only one of the

networks is affected which prevents the complete loss of the system control. Furthermore, the intact brake units connected to the affected network can still be supplied control signals from the brake units connected to the functioning network. Thus, the claimed invention provides true redundancy as compared to the circuit arrangement disclosed by Giers.

Also, in the system disclosed by Giers, there is no redundancy between a commutator 9 or 10 and a corresponding brake actuation unit 5 or 6. There is only a single connection between the commutator and the corresponding brake actuator. Thus, if a failure occurs within that connection, the actuator will not be able to receive any control signals even though both microprocessors are still intact. On the contrary, in the present system, each brake component can potentially receive control signals from either the control network or from another brake component via the auxiliary link. Therefore, even in case of a failure in one of the connections, the control signals can still reach the affected brake component.

Moreover, there is simply no disclosure, teaching or suggestion in Giers to adopt the auxiliary link of the claimed invention to transmit control signals received by one of the brakes components to the other brake components. On the contrary, the auxiliary link pointed to by the Examiner transmits the signals from

the microprocessor to one of the brake components and not from one brake component to another brake component. Giers discloses a system where brake units can only receive the signals directly from the microprocessor. There is no link between the individual brake components that would allow the signals from the microprocessor received by one brake component to be transmitted to the other brake component.

Similarly, there is simply no disclosure, teaching or suggestion in Tsukamoto that the "control signals" which are being transmitted are received by one brake component of the pair and are transmitted from that brake component to the other brake component of the pair. Rather, the "no fault" signals which are transmitted, for example, between brake pressure controllers 10F and 10R in Figure 19 via the communications link between them are generated in the brake pressure controllers 10F and 10R themselves. The "no fault" signals are not received by one of the brake pressure controllers 10F and 10R and transmitted from it to the other one of the brake pressure controllers 10F and 10R.

Since neither of the cited prior art references discloses, teaches or suggests in any way all of the elements of any claim of the present application, Applicant respectfully submits that a combination of the two would not render any claim thereof unpatentable.

Regarding provisional rejection of claims 1 through 21, the claims of the copending application No. 10/674,199 have not been patented and, therefore, applicant respectfully submits that no action from applicant is necessary at the present time. However, applicant intends to file a terminal disclaimer in compliance with 37 CFR 1.321 (c), if the claims of copending application No. 10/674,199 are patented before the issuance of the present application.

For the foregoing reasons, Applicant respectfully submits that all pending claims, namely Claims 1-21, are patentable over the references of record, and earnestly solicits allowance of the same.

Respectfully submitted,

Wesley W. Whitmyer, Jr., Reg. No. 33,558
Todd M. Oberdick, Reg. No. 44,268
ST. ONGE STEWARD JOHNSTON & REENS LLC
986 Bedford Street
Stamford, Connecticut 06905-5619
(203) 324-6155
Attorneys for Applicant